strong financial incentives aimed at making aviation pay its full environmental costs.

Conclusion

The well known environmental problems relating to transport are well known. They are also increasing, with urban transport problems in particular high on the list of public concerns. Policy-makers who wish to move towards sustainable transport should place citizens' need for access to goods and services at the centre of their vision, while working to make transport pay its full environmental costs.

In urban areas, this requires promoting public transport through extending existing links and creating more user-friendly routes. It also means that land use planning should reflect citizens' needs for easy access to employment, educational, consumer and other opportunities. Grid pattern developments that divide people by great geographical distances should be avoided. Transport demand management should be introduced and/or strengthened, using such measures as parking fees and urban road pricing.

Providing improved public transport in rural areas is very important. In far-flung areas this will be difficult, so decentralization of production to the extent possible is also desirable to bring goods and services closer to people.

Infrastructure building should be limited to that which brings real economic benefits. Where infrastructure projects are contemplated, they should be subject to a thorough environmental impact assessment as well as improved economic assessment, taking into account environmental concerns and full economic costs.

The growing volume of freight transport needs to be addressed. For transport policies to be sustainable, the least polluting modes of transport need to be favoured economically and politically. As transport moves closer to paying its environmental costs, goods produced locally and regionally will be favoured over those made further away. Transport logistics and load factors will also improve, increasing transport's efficiency.

Aviation is a particular problem that is very difficult for individual authorities to tackle, given its global nature. The solution to the problem is best found at a supernational level, and ideally at the relevant world body, ICAO. National authorities could investigate possible measures for domestic flights, such as introducing environmental charges and taxing airlines on ticket sales and aviation fuel in line with other transport modes.

Perhaps most importantly for the longer-term sustainability of local, regional or national transport systems, the public needs to be kept informed and involved in the decision-making process. Otherwise, policies that do not show an immediate benefit will not meet with popular approval since there will not be widespread understanding of the issues. With broad popular involvement, as the Swiss example shows, the public supports moves towards sustainable transport policies.

Notes

1. In its 1999 special report on *Aviation and the Global Atmosphere*, the Intergovernmental Panel on Climate Change (IPCC) estimated that aviation could contribute up to 10% of human produced global warming through its CO_2 emissions alone by 2050. As the IPCC has not included the results of implementing the Kyoto Protocol in its estimations, aviation's share could in fact be higher. And CO_2 is not the only aviation pollutant contributing to global warming: pollutants s as nitrogen oxides (NO_x) have a substantial ef on global warming, as they are emitted at hig altitudes. Such pollutants have different effe from when emitted on the ground. The IP therefore estimates aviation's total global warm potential at two to four times higher than tha CO_2 alone.

2. In September 2000, the European Parliam adopted by an overwhelming majority a n binding but politically significant report by Green MEP Caroline Lucas that calls for, am other things, introduction of an environme charge on flights to and from EU airports an worldwide kerosene tax.

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Consumer trends and expectations: an international survey focusing on environmental impacts

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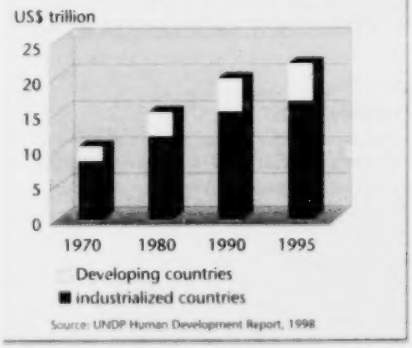
Summary
A UNEP DTIE survey of over 700 "global consumers" in six cities in industrialized and developing countries highlights similarities in current consumption patterns as well as in consumer expectations. Generally, consumers (particularly those in middle to upper income groups) appear ready to support initiatives that would reorient consumption patterns towards sustainability. Nevertheless, perceptions of globalization can differ between consumers in different countries.

Résumé
Une étude de la DTIE du PNUE portant sur 700 « consommateurs mondiaux » sélectionnés dans six villes de pays industrialisés ou en développement fait apparaître des similitudes dans les habitudes de consommation actuelles, ainsi que dans les attentes des consommateurs. Dans l'ensemble, les consommateurs (notamment ceux des groupes à revenus moyens et élevés) semblent prêts à soutenir les initiatives visant à réorienter les habitudes de consommation vers des modes plus compatibles avec un développement durable. Par contre, leur perception de la mondialisation varie d'un pays à l'autre.

Resumen
Encuesta realizada por el DITE del PNUMA, entre más de 700 "consumidores mundiales" en 6 ciudades de países industrializados y en desarrollo. Destaca las similitudes en los actuales modos de consumo y las expectativas del consumidor. En general, los consumidores (sobre todo los de ingresos medios y altos) parecen dispuestos a apoyar iniciativas que permitan un consumo más sostenible. Pero la idea prevaleciente acerca de la mundialización varía de un país a otro.

Global consumption expenditure, private and public, has increased at an unprecedented rate worldwide since the 1970s (**Figure 1**), reaching some US$ 24 trillion in 1998. This unprecedented growth in consumption has had considerable benefits.[1] However, the negative impacts include environmental damage (e.g. deforestation, soil degradation, desertification, biodiversity loss) and greater social inequality.[2] Today's global consumer market is obviously highly complex in nature. **Figure 2** summarizes the challenges we face.

Figure 1
Total global consumption expenditure



Sustainable consumption

The need to address the environmental impacts of economic growth has often resulted in policies aimed at alleviating problems such as water shortages and atmospheric pollution. But there is a growing realization that an approach that considers the effects of current consumption patterns is indispensable.

In 1998, UNEP's Division of Technology, Industry and Economics (DTIE) launched a Sustainable Consumption programme. This programme has worked with other international bodies, national governments, academia, consumer associations and NGOs to develop a global response to current human consumption patterns. As Jacqueline Aloisi de Larderel, the Director of UNEP DTIE, has emphasized: "Sustainable consumption is not about consuming less, it is about consuming differently, consuming efficiently, and having an improved quality of life. It also means sharing between the rich and the poor."[3]

The global consumer class

The global consumer class is made up of consumers who share elements of a common lifestyle. Wherever they live, they are likely to have access to information technology and to purchase similar products.

The term "global consumer class" has been proposed to describe middle- to upper-income earners in all parts of the world. One basic difficulty in sampling these global middle and upper income consumers is that socio-economic groupings differ from one country to another. Studies using methods such as "purchasing power parity" (PPP) have estimated middle income groups to number over 30 million in Brazil, 100 million in China and 200 million in India.

This segment of "global consumers" has been selected for study because they are undoubtedly responsible for a vast majority of the social and environmental problems associated with current consumption patterns. In order to initiate change, research aimed at discovering driving forces and highlighting trends and consumer expectations is therefore essential.

The global consumer survey

The Sustainable Consumption Programme has been researching the consumption patterns and "dreams" of global consumers. The purpose of this work is to provide businesses, governments and academia with clear indications of global consumers' perceptions of environmental and social issues, focusing specifically on their personal consumption habits.

This qualitative and quantitative study has so far surveyed over 700 consumers from six cities: São Paulo, Sydney, Lagos, New York, Mumbai (Bombay) and Paris. The study is intended to:

- identify similarities between these consumers;
- find out about their consumption habits and their expectations; and
- explore global/UNEP policy options.

The survey has been conducted in English, French and Portuguese. Responses have been submitted in hard copy, via e-mail, or directly on-line. Approximately an equal number of responses have been received to date from each of these "global

cities". The following presents some of the findings.

Embracing the concept of a global consumer culture

Consumers in Paris, Sydney and New York appear less enthusiastic about identifying their own consumption behaviour with global consumer patterns than those in São Paulo, Lagos and Mumbai. The latter are constantly inundated with consumption-related messages originating outside their countries. They are often more accustomed to questions that reflect the impact of globalizing forces. The industrialized world may be responsible for the majority of global brand name products and world-recognizable services. However, consumers in Western Europe, North America and selected parts of the Pacific region do not always associate these with globalization (**Figure 3**).

Even consumers in New York and Sydney, the cities where the lowest positive results were recorded, responded positively to the proposal that there was a *global consumer class*. Sydney's "yes vote" totalled 52%, and half of the New Yorkers surveyed also replied in the affirmative.

An average 69% of respondents considered themselves part of a new class of global consumers with similar tastes and preferences. Only 12% replied in the negative.

Figure 2
Six billion consumers, one planet

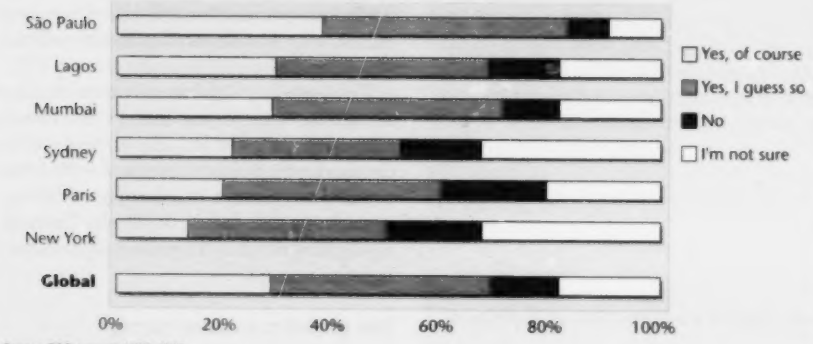
Source: Bentley and de Leeuw, Sustainable Consumption Indicators (EOLSS), 2000

We need awareness campaigns and global understanding that sustainability is for everybody, both the rich and the poor.

Boma, global consumer, Lagos

Figure 3
A global consumer class?

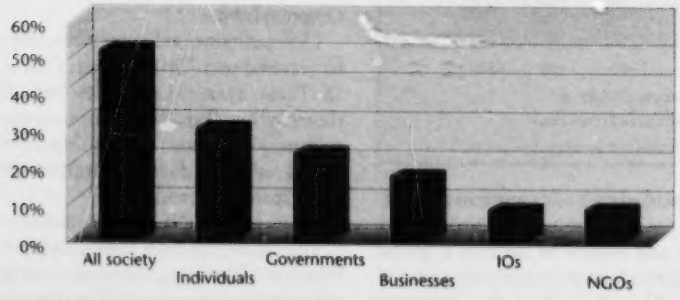
Respondents were asked if they thought they belonged to a new class of consumer



Source: GCC research, MDB, 2000

Figure 4
Consumers accept responsibility

Respondents were asked who they thought was reponsible for changing consumption patterns and promoting sustainability



Note: Respondents were able to select more than one response.
IOs = international organizations; NGOs = non-governmental organizations.

Source: GCC research, MDB, 2000

Who is responsible?

Of course, issues of "responsibility" vary widely among countries. Cultural and political systems influence empowerment and acceptable behaviour. But aside from obvious differences, this global sample highlights an important fact: 83% of consumers ("all society" and "individuals" combined) indicated they recognized that they have a personal responsibility to change general consumption habits and promote sustainability (**Figure 4**).

Governments were considered the second most important source of change (76%), whereas business was identified by 70% of respondents. Certainly all stakeholder groups need to be involved in any process of positive change. However, high recognition of individual responsibility is always encouraging and may acknowledge the weakening of national governments in this respect and the strengthening of "consumer power" in an evolving global marketplace.

Concerned global consumers

Consumers are overwhelmingly aware of the environmental effects of their consumption patterns. 90% indicated that they were conscious of this link. A subsequent inquiry regarding level of consumer concern showed that an average 60% of consumers were concerned "very much" or "quite a lot". In the three cities located in developing countries (São Paulo, Lagos, Mumbai) there were high levels of concern. Over 60% of consumers in these three cities replied that they were very concerned about current practices. In São Paulo, 33% of consumers surveyed said they were very concerned, while 41% were concerned "quite a lot" about the environmental effects of their consumption habits.

Companies are beginning to take notice of the growing number of green/concerned consumers when they attempt to make inroads in developing markets. Various business and government-led initiatives in Mumbai demonstrate that consumers' demand for a cleaner environment is being taken more seriously. Recently, the use of plastic bags in supermarkets has decreased and music stores are reducing or replacing plastic packaging for compact discs.

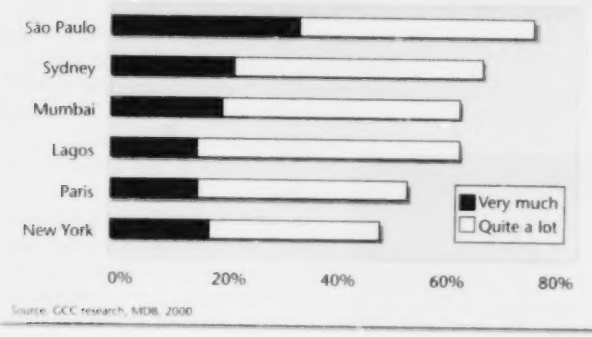
Considering "life behind the product"

Global consumer opinion seems heavily weighted towards a growing interest in what lies behind today's products and services. On average, over 30% of respondents said they considered the "life" behind the products they bought either "always" or "most of the time". A further 45% often or sometimes considered such issues. The increasing desire of consumers to be more involved in the process of getting products to market is being seen worldwide. It is not just a trend in particular regions or cities.

In São Paulo and Mumbai there were substantially higher levels of interest in the life behind the product: 65% of consumers in São Paulo indicat-

Figure 5
Developing and concerned

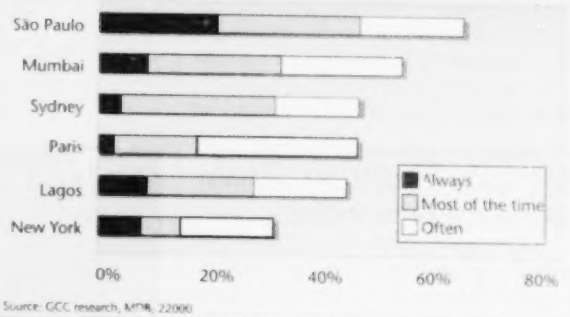
Respondents who are concerned quite a lot or very much about the environmental effects of their consumption



Source: GCC research, MDB, 2000

Figure 6
Life behind the product

Respondents who consider the life "behind" the products they buy



Source: GCC research, MDB, 22000

Consumers are increasingly interested in the world that lies behind the product they buy. Apart from price and quality, they want to know how, where and who has produced the product. This increasing awareness about environmental and social issues is a sign of hope. Governments and industry must build on that.

Klaus Toepfer,
UNEP Executive Director

ed that they "often", "most of the time" or "always" considered such issues. This compares with only 31% of those in New York. Arguably, consumers in developing countries often have more reason to distrust products and services on the grounds of quality or safety. Overall, though, global consumers are starting to challenge the producers of goods and services to varying degrees.

Calling for change

Common themes and desires appear to exist among global consumers with respect to the need for positive change. The majority of those surveyed are aware that their consumption habits impact the world in which they live. There is undoubtedly a willingness to accept change, but there is not always the drive or understanding necessary to change individual habits.

Moreover, individual needs differ from one consumer to the next. What does sustainable consumption mean to someone in Mumbai who has barely enough food to survive? This study is purposely not targeting the struggling millions in cities in developing countries. The global consumer class, despite many cultural dissimilarities, has met its survival needs (e.g. for food, water, housing) and is in pursuit of satisfying various other "wants".

I think a few very focused campaigns would have an impact, but too many campaigns would dilute the issues and the public at large (at least in the US) would turn off to them.

Paul, global consumer,
New York

These consumers should be considered the target group for an immediate global campaign. They are generally the trendsetters. The sustainability message could flow naturally from them to other parts of society. Major differences among even the most global cities in industrialized and developing cannot be discounted. But change has to begin somewhere. Action, if only in the form of information provision in some cities, must continue.

Conclusion

In terms of promoting and initiating positive change, the need to change consumption patterns towards sustainability is currently receiving wide global coverage. This UNEP DTIE project aims at focusing attention on the need to balance and harmonize global consumer behaviour with environmental impacts.

I live between Asia and South America. Recycling, as well as buying green eco-products, are not widely practised in either of the two countries I live in. But I'd prefer them if they were available. When I'm in Europe, I take it more seriously. Consequently, I believe government policies have ALL to do with my consumption habits.

Cibele, global consumer,
Brazil

Consumers are calling for change. They seem genuinely, and encouragingly, ready to support and accept viable initiatives. A successful sustainable consumption campaign targeted at global consumers residing in global cities should bring us a little closer to a sustainable future.

Notes

1. UNDP (1998) *Human Development Report*. Oxford University Press, New York.
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3. UNEP/CDG (2000) *Sustainable Consumption and Production. Creating Opportunities in a Changing World*. Report of the 4th International Business Forum, Berlin, 1999.

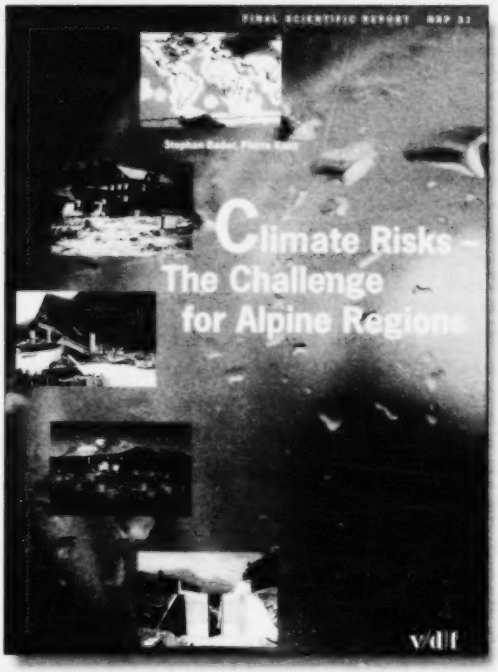
◆

World News

Swiss study focuses on climate change in Alpine region

Climate change can potentially create or exacerbate natural disasters in every part of the planet. Although much of the world's attention to date has been devoted to hurricanes in the tropics and the possibility of rising sea levels, it is increasingly clear that colder climates and inland areas would also be affected by changes on a global scale. In response to the perceived threat of climate change, the Swiss government commissioned a major study programme on potential climate change effects in the Alpine region. This study emphasizes prevention of natural disasters linked to climate change. It is also intended to contribute to international cooperation on climate change research and response.

The natural hazards (floods, landslides, mudflows, avalanches, icefalls, storms, drought and forest fires) that Switzerland already has to deal with could become more severe due to climate change. Although some events cannot be prevented, the damage caused by any of them can be reduced through appropriate forecasting, preparation and response. The Swiss study examined the interrelated causes of these events and recommended planning and response measures.



To carry out the study, 55 teams of scientists from several different disciplines focused on five main areas: climate, the hydrological cycle, natural disasters, ecosystems, and society. With respect to society, the emphasis was on ways to translate the study results into practical action.

The study found that while the pattern of weather-related natural hazards has not shown any unusual changes in Switzerland during recent years, human activities have been greatly extended into existing hazard zones. Development planning often fails to consider all the natural hazards from weather and climate. Allowance is made for frequent and familiar events such as avalanches, but many developments are ill prepared for less common but potentially far more damaging events.

The climate effects simulations carried out demonstrated that noticeable changes in snow and ice cover, hydrology and vegetation are likely to occur in Switzerland as temperatures increase. The climate-related incidents that already occur, such as flooding, are unlikely to be more severe, but they are likely to happen more frequently and to be more widespread. Seasonal patterns are expected to change. In a warmer climate, for example, mudflows and torrents would be expected to start earlier in the spring and continue later into the autumn. It is predicted that ecosystems will be affected by changes in atmospheric content, as well as temperature and weather changes.

Many climate change related events are also expected to have significant economic consequences. Switzerland's tourist industry, a major source of income and employment, could be harmed by lack of snow in winter resort areas. As elsewhere in the world, climate related disasters such as severe storms could lead to enormous insurance claims. Swiss insurers, already aware of the risks, have been among the industry leaders in responding to the climate change threat, as shown, for example, by their participation in UNEP's Insurance Initiative.

Implementation plans and activities to promote both public discussion and ongoing research are integral and important parts of the study. Although the actual study programme has ended, Swiss research institutions and universities are conducting follow-up research on climate change and related areas. The authors point out that the uncertainties of climate change call for more research, but that change and a degree of unpredictability are the nature of the Earth's climate. They argue that it is essential for any overall assessment of the climate, or related risks, to leave room for unforeseen factors. Climate change response measures must therefore be far-sighted and constantly take new information into account.

Overview of impact of climate change for Switzerland (2030 - 2050). (NRP 31 Final Report, "Meier")

Sectors	Probability of occurrence	Extent of impact	Consequences
Snowline +300 to +500 m Period of snow cover -20 to 40 %	+++ ++	--- ---	- Pre-Alps, Jura - Tourism, in particular winter tourism
Number of glaciers -80 % Glaciated area -70 %	+++ +++	- -	- Tourism, environment, power generation, society water resources
Lower limit of permafrost +200 to +700 m	+++	-	- High mountains (>2400 m) - Infrastructure, cable-ways, possibly housing
Change in avalanche activity	-	(±)	- People, buildings, property, infrastructure
Alpine mudflows Peri-alpine mudflows	+ ±	- -	- Buildings, property, infrastructure, landscape
Hydrological cycle: more winter water flow	++	-	- Environment, water resources, power generation
High water (esp. Alpine zones) Floods	+ ++	--- ---	- People, buildings, property, infrastructure
Ground water Drought	+ ++	-- -	- Water resources, supplies, agriculture
Summer storms/hail Winter storms	++ +	- --	- Buildings, property, infrastructure, agriculture and forestry
Forest: - not adapted to their habitat: 25 - 30 %, plus further 5 -30 % in future - increase in biomass - treeline +100 to +300 m - fires in southern Alps	 ++ ± + ++	 - (+) + -	 - Drop in productivity - Rise in productivity - Increase in protective functions - Housing, drop in productivity
Agriculture (arable land)	++	±	- Agricultural productivity, incomes
Migration, refugees	+++	---	- Society, economy

Probability of occurrence of impact of climate change (scenarios):
+++ (Relatively) high probability of occurrence
++ Moderate probability of occurrence
+ Low probability of occurrence
n Zero or very low probability of occurrence
- Occurrence improbable

Extent of potential impact (losses or benefits):
--- Significant negative impact: high potential for losses
-- Moderate negative impact: moderate potential for losses
- Reduced impact with limited potential for losses
+ Slight positive impact: potential for benefits
( ) Impact very uncertain

Evaluation of the financial gains and losses resulting from climate change (calculation basis: 1995, figures for the whole of Switzerland) (NRP 31 Final Report, "Meier")

Gains and losses per sector		Monetary basis 1995 Resources/revenues in Sfr millions per year	Comments
Overall tourism		1780 bis -2280	Loss in revenue (in particular Pre-Alps/Jura, from glacier skiing, reduced attractiveness)
- Loss in revenue Pre-Alps/Jura		1600 bis -2100	Gross revenue from winter sports Sfr 5.3 billion, losses of approx. 30–40 %
- Glacier skiing		-30	Rough estimate
- Reduced attractiveness		-150	Loss in revenue (~3% of Sfr 5 billion)
- Gains due to summer coolness (Switzerland)		+100	Summer mountain tourism (+2 % of Sfr 5 billion)
High water/floods		-135 bis -450	Bad weather data provided by WSL for 1972–1996, +30 % to +100 %
Drought/aquifer systems/water supplies		-200	- Agriculture, losses in productivity through lack of irrigation - Additional investment in water supply
Summer storms/hail/ winter storms		-70 bis -110	"Socio-economic" costs relating to storm and hail damage +30 % to +50 % depending on climatic scenarios
	Forests	approx. -50	"Hot and dry" hypothesis, approximate calculation: biomass +, Alpine economy, effect of protective function +
	Maladaptation		
	Rise in treeline	approx. +10	
Agriculture		-10	Loss in productivity despite the "CO_2 nutrient effect", growth period, altitude
Energy	Power generation		Decrease in dam capacity, increase in relation to low-land power stations
	Energy consumption	+30	Reduction in heating requirements, increase in cooling requirements
Emigration/refugees		-80	Increase in welfare costs of approx. 10 %
Total	Damage/losses	-2325 bis -3180	
	Gains/gains	+140	
Proportion of losses in relation to GNP 1995 (378,000)		0.6 % bis 0.8 %	

– No marked potential for loss in market values
+ Possible gains due to climate change
Figures in bold: costs/losses

For more information, contact: NRP 31 Programme Leaders, Thunstrasse 91, CH-3006 Bern, Switzerland, Tel: +41 31 356 65 65. The study report can be ordered from vdf Hochschulverlag AG an der ETH Zürich, ETH Zentrum, CH-8092 Zurich, Switzerland, Tel: +41 01 632 42 42, Fax: +41 01 632 12 32, E-mail: verlag@vdf.ethz.ch, Internet: www.vdf.ethz.ch. ◆

Chinese government plans environmental improvements

The Chinese government has announced that its next Five-Year Plan (2001 to 2005) will include both legal measures and investments to improve the environment. In making the announcement, Xie Zhenhua, Minister of the State Environmental Protection Administration, acknowledged that serious environmental problems exist in China. He stressed that development needs will be balanced with efforts to reduce pollution and protect natural resources. Mr. Xie made these remarks at a seminar on sustainable development in Beijing on 30 October. Chinese Premier Zhu Rongji spoke on the same subject at a meeting in Beijing on 2 November, pointing out that China will invest more in environmental protection in the coming years and will be committed to a strategy of sustainable growth. He emphasized that the Chinese Government has realized the importance of environmental protection and sustainable development in recent years and is committed to increasing funding.

In addition to government investments, China will encourage both domestic and international private enterprises to invest in environmental infrastructure construction, management and pollution control. Inadequate investment in environmental protection has been a long-term problem in these areas. However, both Zhu and Xie emphasized the government's position that environmental protection must be accompanied by economic progress. "Only with better development can the government and enterprises attain the money and technology to fight pollution," Xie said.

One of the goals of the Ninth Five-Year Plan (1996-2000) was to limit gross pollution to the level it had reached in 1995. The government reports that by 1999 that goal was surpassed, with the gross pollution level being lowered. Environmental investment during these five years totalled 380 billion yuan (US$ 45.9 billion), approximately 1% of China's gross domestic product. For comparison, the level of investment was about 0.7% during the Seventh Five-Year Plan (1986-1990) and about 0.8% during the Eighth Five-Year Plan (1991-1995). The goal of the Tenth Five-Year Plan is to reduce gross pollution levels by 10% by 2005.

China's long-time emphasis on economic growth over pollution control has led to serious air pollution in urban areas, declining water quality, and widespread soil degradation. Pollution-related health problems, including lead poisoning of children and respiratory disease, are growing worse in many cities.

The government's environmental focus in the new Five-Year Plan comes at the same time as a national poll showing that environmental protection has been the issue of greatest interest among urban residents, ahead of previous top issues such as unemployment, education, anti-corruption efforts and crime. About half of urban residents polled said environmental protection was their top concern during 2000, according to statistics provided by a Beijing-based marketing company.

Xie said legal means will be an important tool for promoting cleaner production. Businesses that do not install pollution treatment facilities will be heavily fined, while those who adopt relatively expensive environmentally friendly technologies and techniques will receive financial incentives. Cleaner production is to be combined with industrial restructuring, including phasing out of low-efficiency, high-pollution industries and the promotion of relatively clean industries (e.g. high-tech and services).

For more information, contact: SEPA, No. 115 Xizhimennei Nanxiaojie, Beijing 100035, P.R. China, Tel: +86 10 66153366, Fax: +86 10 66151768, Internet: www.sepaeic.gov.cn/.

Worldwatch Institute names new president

The Worldwatch Institute has appointed Christopher Flavin its new president. He succeeds Lester Brown, who became chairman of the board in April 2000. Brown founded the Institute in 1974. The new president has served as Vice President for Research and as Senior Vice President. He was named Acting President earlier this year.

Flavin studied economics, biology and environmental studies at Williams College, where he graduated *cum laude* in 1977. He has been a writer and speaker on energy and environmental issues, and has been active in international negotiations on climate change during the past decade. He has contributed to all 17 of the Institute's annual *State of the World* reports.

Worldwatch is a non-profit environmental research and advocacy organization promoting sustainable development. It produces a variety of annual reports, books and magazines that cover agriculture, biological diversity, energy, population, and international economics and institutions. The Institute is supported by financial contributions from private foundations, individual donors, and additional revenue from publications sales and other earned income.

For more information, contact: Richard Bell, Vice President for Communications, Worldwatch Institute, Tel: +1 202 452 1992, ext. 537, E-mail: dbell@worldwatch.org, Internet: www.worldwatch.org.html. ◆

Industry Updates

North American fisheries study finds threat of extinction

A three-year study by the American Fisheries Society (AFS) has concluded that 82 marine species may be wiped out in North American waters as a result of overfishing and habitat destruction. The AFS, a group of scientists and professional fisheries managers, surveyed their rarity, range size, habitat requirements and population resilience. Its list of threatened species includes commercial fish such as sturgeon, cod, grouper, Atlantic salmon and Atlantic halibut, as well as sea horses and several species of sharks. Twenty-two species may be facing global extinction.

Five geographic "hot spots" where several species are at risk were identified: the Indian River (Florida) Lagoon, Florida Keys, Florida Bay, Puget Sound and the northern coast of California, and the Gulf of California.

The most important factor in determining species' vulnerability to extinction is low reproduction rates, followed by habitat degradation. Over half the threatened species are native to the waters off Florida, where a population boom and coastal development have caused habitat loss and water quality degradation.

The study found that it is important to recognize populations potentially at risk at an early stage in their decline, and to put conservation measures in place to prevent further population reductions or extinction. AFS recommends that governments increase protection of critical fish habitat and place some areas off-limits to fishing altogether, so that a portion of the stocks is free from fishing pressures. It urges federal, regional, state and international policy-makers to increase research and assessment and international cooperation, as well as improving bycatch reporting and consideration of different types of fishing regulations.

The full study is available at *www.fisheries.org/publications/epubs/mstocks/mstocks.shtml.*

For more information, contact: AFS, 5410 Grosvenor Lane, Bethesda, MD 20814, USA. Tel: +1 301 897 8616, Fax +1 301 897 8096, Internet: www.fisheries.org. ◆

IBM's recycling programme for consumers and small businesses

IBM has created a new computer equipment recycling programme aimed at individual consumers and small businesses. The IBM PC Recycling Service will accept any manufacturer's PCs, including system units, monitors, printers and optional attachments. The cost – paid by the equipment owner – is US$ 29.99, including shipping within the US. Equipment owners are responsible for packing the equipment and dropping it off for shipment to a designated recycling centre by UPS. Customers who buy new IBM equipment can decide to participate in this recycling service at the same time.

Depending on computers' age and performance, the service may recycle the equipment, reusing or recycling as many parts and materials as possible and disposing of the rest in accordance with proper waste management techniques. If a computer is determined to be still useful, IBM will refurbish it and arrange for its donation to Gifts in Kind International (GIKI). GIKI, the world's leading charity for product philanthropy, contributes to a network of over 50,000 non-profit organizations. If the computer can be donated, the donor receives a receipt allowing a potential US federal income tax reduction.

IBM, because of its size, can obtain shipping and recycling services at considerably lower costs

Sustainable mobility: a more sustainable transport future

Under the auspices of the World Business Council for Sustainable Development (WBCSD), nine world companies have embarked on a US$ 10 million international project. This unique initiative – the **Sustainable Mobility Project** – sets out to evaluate the global effects of today's land, sea and air transport industry, and to develop visions of how society's ever-increasing desire for greater mobility can be met in the future.

The member companies – BP, DaimlerChrysler, Ford, General Motors, Michelin, Norsk Hydro, Shell, Toyota and Volkswagen – have established a Working Group. This group will look at a wide range of relevant issues such as technological advances, emissions, fuel efficiency, climate change, urban planning, roads, public transportation, resource use and conservation, safety, public health, employment, knowledge management and government policies

In a recent joint statement, the project's co-chairmen made it clear that it "aims to provide a strategic direction for the many industries associated with mobility and to create ideas for next-generation systems that will address social, environmental and economic concerns about the transport sector. We shall approach the subject from a global perspective because the challenges are global and solutions will depend on cooperation between government, business and civil society."

Edouard Michelin, Head of the Michelin Group, explains why they are engaged in the Mobility project. "We believe sustainability and success will become synonymous. Our company and others involved in this project are enthusiastically taking a responsible role in shaping the future. We have to do our share so that mobility becomes again a vehicle of liberty, fully satisfying two basic needs: safety and protection of the environment."

The WBCSD is confident that out of this work will come clear visions of mobility for the future. Visions that take into account the access needs of the developing world, of population changes and the necessity of economic growth in poor countries, while ensuring that transportation's contribution to that growth is sustainable. The project will assess both the positive and negative impacts of transport, and examine what is required to make it sustainable.

A *Mobility 2000 Report* is scheduled for the first quarter of 2001. This report will outline "where we have come from and where we are now". It will be the baseline for the whole process of the project, with a target completion date of mid 2003 when a final report, *Sustainable Mobility 2030*, will be published. However, an interim report will target the Rio+10 summit in June 2002.

UNEP is contributing to the project through the "Stakeholder Dialogues" organized in both developed and developing countries, based on its environmental expertise and experience with its Mobility Forum.

The WBCSD is a coalition of some 150 leading international companies united by a shared commitment to sustainable development. It is an independent organization, which encourages member companies in all business sectors to work together on sustainable development issues.

For further information, contact: John Rae, Project Director, Tel: +41 22 839 3146, E-mail: rae@wbcsd.org; Claudia Schweizer, Project Officer, Tel: +41 22 839 3150, E-mail: schweizer@wbcsd.org; or Alyson Slater, Press Officer, Tel: +41 22 839 3187, E-mail: slater@wbcsd.org. WBCSD, 4 chemin de Conches, CH-1231 Conches-Geneva, Switzerland. Internet: www.wbcsd.org

than those available to individual consumers. By passing these savings on to users of the service, it hopes to encourage recycling and environmental preservation as well as providing donation recipients with greater access to technology.

Rapid advances in computer technology, and the steady introduction of new products, have led to a growing disposal problem for unwanted or obsolete computers (see Industry Update in *Industry and Environment*, Vol. 22, No. 2-3). IBM's new programme extends to individual and small businesses some of the same recycling services the company has offered large customers for several years. Under the existing programme, it recycled over 120 million pounds (54.5 million kg) of returned equipment parts and machines in 1999, with less than 4% found to be unsalvageable or non-recyclable.

For more information, contact: Rhea Hale, IBM Engineering Center for Environmentally Conscious Products. Tel: +1 919 543 8626. E-mail: rhale@us.ibm.com. Internet: www.ibm.com/ibm/environment.

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UNEP Focus

UNEP

New UNEP initiative on coral reefs

Coral reefs are among the world's richest and most productive ecosystems, but they are extremely sensitive to human impacts. UNEP's Executive Director Klaus Töpfer calls them "the ecosystem equivalent of the canary in the coal mine, giving early warning that the world's ecosystems can no longer cope with growing human impacts." Reefs also protect coastlines from storms and erosion.

Over a quarter of the world's coral reefs have already been lost. According to UNEP's GEO 2000 report, half of the rest are under threat from human activities. Among these are the reefs with the highest level of biodiversity (see table). In some places the situation is far worse. In Indonesia, for example, half the coral reefs that once surrounded it are dead, costing Indonesian society over US$ 200 million per year. The widespread bleaching and die-off of corals over the last few years has been linked to climate change and global warming. Reefs are also stressed by overfishing, the impacts of tourism, and land-based sources of pollution.

Coral bleaching due to high water temperatures.

UNEP has established a new Coral Reef Unit whose purpose is to play a major role in the international effort to save the planet's threatened coral reefs. The new unit will be responsible for UNEP's participation in the International Coral Reef Action Network (ICRAN), a partnership of international organizations involved in coral reef science and conservation created with the financial support of the United Nations Foundation. ICRAN aims to halt global degradation of coral reefs, and to maintain their biodiversity and health. Through the coordinating units of UNEP's Regional Seas Conventions and Action Plans in the Caribbean, the Pacific and the Indian Oceans, ICRAN will work to demonstrate better reef management practices through practical action in the field, as well as to improve reef assessment and increase public awareness of the importance of reef resources.

The Coral Reef Unit is part of UNEP's Division of Environmental Conventions. It will work closely with the Division of Early Warning and Assessment and UNEP DTIE. The Director of the Coral Reef Unit, Arthur Dahl, is a coral reef ecologist with more than 30 years of experience in reef research and management. He organized the South Pacific Regional Environment Programme, was a founding council member of the International Society for Reef Studies, and wrote the first international coral reef monitoring handbook.

UNEP DTIE is also working on industry-related coral reef issues as part of its commitment to the International Coral Reef Initiative – a network of international organizations, governments and other groups combating coral reefs' degradation. With the financial support of the French Ministry of Environment, UNEP DTIE has started work on the International Coral Reef Information Network's tourism component in the Wider Caribbean Region. It has been developing awareness-raising tools to be distributed in the region. The first steps are to create an awareness campaign targeting tourism, and to produce communication tools for distribution in the region.

The Bali Coral Reef Symposim

An international meeting of experts in Bali, Indonesia, in October drew attention to the critical condition of the world's coral reefs. UNEP co-sponsored the Ninth International Coral Reef Symposium, where participants reviewed the state of knowledge of coral reefs and discussed resource management, the effects of socio-economic values on human activities that affect reefs, and reef assessment, monitoring and rehabilitation.

One of the papers presented at the symposium

Coral reefs continue to decline

Regions of the world	% reef destroyed pre-1998	% reef destroyed in 1998	% reef in critical stage loss 2-10 years	% reef threatened loss 10-30 years
Arabian region	2	33	6	7
Wider Indian Ocean	13	46	12	11
Australia, Papua New Guinea	1	3	3	6
Southeast and East Asia	16	18	24	30
Wider Pacific Ocean	4	5	9	14
Caribbean Atlantic	21	1	11	22
Status 2000 Global*	**11**	**16**	**14**	**18**

* mean values adjusted for the proportional area in each region of the global total of coal reefs

Source: Clive Wilkinson, Global Coral Reef Monitoring Network, 2000

shed new light on the causes of coral bleaching, which occurs when the anthozoan organisms that form coral expel the colourful algae that normally live within them symbiotically. Coral bleaching is associated with high water temperatures. Research by Ove Hoegh-Guldberg of the University of Queensland showed that algae lose their ability to perform photosynthesis if water temperatures rise too much, producing toxic compounds instead. The coral organisms therefore expel the algae. If temperatures drop to an acceptable range within a few months, algae can begin to live in the coral again and conditions return to normal. If the temperature remains too high for longer periods, however, the coral will die. A mass bleaching that killed 16% of the world's coral reefs during 1998 alone was caused by El Niño-related climate events in the Indian Ocean. Global warming, which is expected to cause higher ocean temperatures and unusual climate patterns, has very serious implications for coral reefs. Moreover, coral grows more slowly in the presence of high levels of atmospheric CO_2, reducing the reefs' ability to recover from damage.

Reef fish

Fish, like algae, are an essential part of reef ecosystems. Reefs worldwide are endangered by overfishing: an economic as well as environmental threat, as reef fish are an important food source, are prized by aquarium fish collectors, and are major tourist attractions. Fish are a renewable resource when properly managed, but reef fish may be even more vulnerable to overfishing than ocean fish due to their slow growth and limited reproductive range. Reducing fish populations below a critical level can lead to ecological changes that make their recovery impossible.

Tropical reef fish, which are popular for aquariums, are often caught using cyanide or explosives, which have deadly impacts on reefs and on the marine life they support. Although these practices are illegal, they take place in areas where declining fish populations have made traditional methods more difficult. Cyanide and blast-fishing not only harm the target fish, but kill other marine life around them, including coral. A typical blast creates a crater two and a half metres wide and destroys a 20 cubic metre area of reef. A new organization, the Marine Aquarium Council, was established in 1998 to try to eradicate fishing with cyanide. It plans to offer certification for fish sold in some pet shops by the end of 2001. Since fish caught using poison are more likely to die within a short time of purchase, buyers also have an interest in safer fishing methods.

Even when they are allowed to stay put, tropical reef fish and their homes are vulnerable to man-made threats from tourism and recreational diving. Many divers do not realize that simply touching coral can cause organisms to die. Repeated contact with divers and boat anchors has already resulted in severe local damage in much frequented dive spots such as the resorts along the Red Sea. Preventing this type of damage is one of the goals of UNEP DTIE's tourism-related work.

Proposals for protecting coral reefs

Protection of coral reefs is complicated, partly because so many decisions and activities affecting them are local. Some 500 million people live near reefs, many of them in developing countries and many directly or indirectly dependent on reef ecosystems for their food and livelihood. Local protection efforts are under way in a number of countries. In Fiji, for example, reserves have been created where all fishing is banned, while in other areas fishing of some species has been limited to certain seasons. After three years, the results are encouraging. Stocks of fish, shellfish and other species have greatly increased, and fishing yields have improved to such an extent that local fishermen need only half as much time to bring in their catch.

Several participants in the Bali symposium proposed community management of reefs as an important tool for their protection. Financial instruments such as diving fees, area entry charges, and concessions can also be used as incentives for local people to safeguard reefs. Speakers also mentioned the need for strict enforcement measures aimed at those who use illegal fishing methods, pointing out that "carrot" programmes such as alternative income schemes are highly prone to failure if they are not combined with the "stick" of strong enforcement. One of the major reasons for Fiji's success to date is that there is local control over, and interest in, reefs and fishing rights. The key factor is control of reefs' use by local people, who have an interest in preserving them and the power to do so.

For more information, contact: Arthur Lyon Dahl, Director, Coral Reef Unit, UNEP, International Environment House, 11-13 Chemin des Anémones, CH-1219 Châtelaine, Geneva, Switzerland, Tel: +41 22 917 8207, Fax: +41 22 797 3471, E-mail: arthur.dahl@unep.ch, Internet: www.unep.ch/coral.html; or Clive Wilkinson, Global Coral Reef Monitoring Network, Australian Institute of Marine Science, PMB #3, Townsville 4810, Australia, Tel: +61 7 47724314, E-mail: c.wilkinson@aims.gov.au, Internet: www.aims.gov.au/pages/research/coral-bleaching/scr2000/scr-00gcrmn-report.html.

Information about the new UNEP initiative is available at www.unep.ch/coral.html. To find out more about the issues discussed and many of the papers presented at the Ninth International Coral Reef Symposium, consult www.nova.edu/ocean/9icrs/. ◆

UNEP meeting adopts draft strategic programme on environmental law

UNEP officials and senior legal experts from 70 governments have adopted a draft UNEP strategic programme on environmental law for the next decade. Their meeting at UNEP headquarters in Nairobi on 23-27 October responded to a request from UNEP's Governing Council at its 20th session in 1999.

UNEP's long-term strategic planning on environmental law, known as the Montevideo Programme, has served as the basis of its activities regarding development of environmental law during the past two decades. Achievements under this programme include developing global conventions on the ozone layer, transboundary movements of hazardous wastes, biological diversity and information exchange on hazardous chemicals. The plan for the next decade is intended to further contribute to the progressive development of environmental law.

After an extensive discussion of 20 proposed subject areas, participants agreed on a comprehensive environmental law programme for UNEP action. The programme is designed to increase the effectiveness of environmental law and addresses issues such as implementation, compliance and enforcement; capacity-building; prevention and mitigation of environmental damage; avoidance and settlement of international environmental disputes; strengthening and development of international environmental law; harmonization and coordination; public participation; information technology; and innovative approaches to environmental law.

The programme considers sectoral environmental issues, including freshwater resources, coastal and marine ecosystems, soils, forests, biological diversity, pollution prevention and control, production and consumption patterns, and environmental emergencies and natural disasters. It also focuses on the links between environmental

and other fields such as trade, security, and military activities.

The draft Montevideo Programme was prepared for submittal to the 21st session of the Governing Council of the UNEP/Global Ministerial Environment Forum in Nairobi in February 2001.

For more information, contact: Alexandre Timoshenko, Officer-in-Charge, Legal, Economic and Other Instruments, Division of Environmental Policy Development and Law, UNEP, PO Box 30552, Nairobi, Kenya, Tel: +254 2 623478, Fax: +254 2 624324; or Tore J. Brevik, UNEP Spokesman/Director of Communications and Public Information, Tel: +254 2 623292, Fax: +254 2 623692, E-mail: cpiinfo@unep.org ◆

Dr. Michel Batisse, French scientist, wins Sasakawa Prize

The 2000 UNEP Sasakawa Environment Prize has been awarded to French scientist Michel Batisse for his outstanding contributions to conservation of the world's natural resources, protection of the terrestrial and marine environment, and promotion of sustainable development. Dr. Batisse was presented the US$ 200,000 award at a ceremony at UN Headquarters in New York on 17 November. Sponsored by The Nippon Foundation and founded by the late Mr. Ryoichi Sasakawa, it has been awarded annually since 1984 to individuals who have made outstanding global contributions to environmental management and protection.

"Dr. Batisse has been the architect and promoter of some of the most innovative and significant environmental research and training programmes conducted at the global and regional level," said Lord Clinton-Davis, Chairman of the Selection Committee. "He has always used his talent and knowledge to bring together large numbers of scientists to work on common environmental objectives of major importance to humankind."

Dr. Batisse organized the Man and Biosphere (MAB) Conference in Paris in 1968, a pioneering event that paved the way for the 1972 Stockholm Conference and advocated what would become known as sustainable development. The MAB Conference resulted in the establishment of biosphere reserves where conservation of biological diversity is combined with research, monitoring and education. These areas are recognized today as an important way to implement sustainable development and preserve biological diversity in cooperation with local communities. The world network of biosphere reserves now comprises some 368 sites in 91 countries.

UNEP's Executive Director, Klaus Töpfer, cited Dr. Batisse's experience as a major contributor to the preparation of the UNEP Conference on Desertification in 1977, together with his involvement in establishing a number of national centres including the Jodhpur Desert Research Institute in India, the Negev Desert Institute in Israel, and the Egyptian Desert Institute. Dr. Batisse is also the driving force behind the Mediterranean Blue Plan, in which all bordering countries and the European Union cooperate towards sustainable development in the region.

Nomination forms for the 2001 prize can be obtained from UNEP's Nairobi headquarters or on its web site at *www.unep.org/sasakawa2*.

For more information, contact: Tore J. Brevik, Spokesman/Director, UNEP Communications and Public Information, Tel: +254 2 62 3292, Fax: +254 2 62 3927, E-mail: tore.brevik@unep.org; or Elisabeth Guilbaud-Cox, Secretary, UNEP Sasakawa Environment Prize, PO Box 30552, Nairobi, Kenya, Tel: +254 2 62 3401, Fax: +254 2 62 3692, E-mail: elisabeth.guilbaud-cox@unep.org. ◆

UNEP web site aids Global International Waters Assessment

The Global International Waters Assessment (GIWA) is a cooperative effort of UNEP, the Global Environment Facility (GEF), the University of Kalmar, the Swedish government, and more than 100 water quality centres around the world. The international team will undertake a holistic assessment of global waters, gathering information on both fresh water and oceans, and looking at the pressures resulting from human activities on aquatic ecosystems and possible target areas and activities needed to protect ecological systems and water supplies. Its new web site, at *www.giwa.net*, has been launched to support global water assessment and provide information to those involved in the project and to the public. It includes informative maps that allow citizens access to data and information about the Earth's major water systems.

During the project's initial phase, 66 major aquatic ecosystems in different parts of the world were identified for detailed analyses. The project will be carried out by nine regional task teams and 66 sub-regional water science teams from around the globe. They will take advantage of UNEP's network of over 200 regional and national environmental information consortia, under the UNEP-Infoterra network, Global Environmental Outlook (GEO) and Global Resource Information Database (GRID) network.

The response to many key environmental issues depends on critical use of information on water quality, pollution, ecological conditions, including social and economic conditions, and other factors that are the root causes of environmental degradation of freshwater and ocean water systems. "A global project of this magnitude requires a tremendous level of cooperation and organization to harmonize the water related information from the GIWA global teams of experts and synthesize these data through scientific methods for reporting to the governments on the status and pressures on the aquatic ecosystems, and the policy options for action," said project manager Dag Daler. The web site will make it possible for all participants, as well as the public, to share and have access to information generated during the assessment.

For more information, contact: Beth Ingraham, Information Officer, Division of Environmental Information Assessment and Early Warning, UNEP, PO Box 30552, Nairobi, Kenya, Tel: +254 2 624299, Fax: +254 2 624269; or Göran Rudbäck, Liaison Officer, Global International Waters Assessment, GIWA, SE-391 82 Kalmar, Sweden, Tel: +46 480 44 73 52, Fax: +46 480 44 73 55, E-mail: goran.rudback@giwa.net or info@giwa.net. ◆

UNEP Division of Technology, Industry and Economics (DTIE) HIGHLIGHTS

POPs treaty finalized

Representatives from 122 countries meeting in Johannesburg, South Africa, finalized the text of a legally binding treaty that will require governments to minimize and eliminate persistent organic pollutants (POPs). The treaty, which has been under negotiation since 1997, must now be signed and ratified by national governments. Once 50 governments have done so, the treaty will enter into force, a process that normally takes several years. The meeting in Johannesburg was the fifth and final POPs negotiating session. There were some 600 participants. The treaty will be formally adopted and signed by ministers and other plenipotentiaries at a Diplomatic Conference in Stockholm on 22-23 May 2001.

John Buccini, the Canadian government official who chaired the talks, described the treaty as "a legal document that constitutes a declaration of war on POPs." It establishes control measures covering the production, import, export, disposal and use of POPs. Governments that adopt it commit themselves to promoting the best available technologies and practices for replacing existing POPs, while preventing the development of new ones. They will draw up national legislation and develop action plans for carrying out their commitments. The treaty also provides for financial mechanisms to help developing countries and economies in transition meet their obligations. Both funding and technical assistance will be provided.

POPs, which are highly toxic to humans and animals, can cause cancer, allergies and hypersensitivity, damage to the central and peripheral nervous systems, reproductive disorders, birth defects, and disruption of the immune system. They are among the most dangerous of all pollutants, as they are highly stable compounds that can persist for years or decades before breaking down. They circulate globally through a process known as the "grasshopper effect": POPs released in one part of the world are transported through the atmosphere by a repeated (and often season-

The Carrousel du Louvre and UNEP's DTIE office in Paris hosted an exhibit of prize-winning photos from the UNEP/Canon International Photographic Competition on the Environment 1999-2000.

al) process of evaporation, deposit, evaporation and deposit to regions far from the original source.

POPs are all the more hazardous in that they concentrate in living organisms through bioaccumulation. Although not soluble in water, they are readily absorbed in fatty tissue, where they can become concentrated at up to 70,000 times the background levels. Fish, predatory birds and mammals, and humans, which are high in the food chain, tend to absorb the greatest concentrations. Because humans and animals move about, bringing the POPs in their bodies with them, these pollutants can be found in people and animals living in regions such as the Arctic that are thousands of kilometres from any major POPs source.

There are alternatives to most POPs, but high costs, lack of public awareness, and the absence of appropriate infrastructure and technology often prevent their adoption. Solutions must be tailored to the specific properties and uses of each chemical, as well as to each country's climatic and socio-economic conditions. The POPs treaty therefore makes some provisions for local conditions and needs.

The 12 POPs covered by the treaty include eight pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex and toxaphene), two industrial chemicals (PCBs and hexachlorobenzene, which is also a pesticide), and two unwanted by-products of combustion and industrial processes (dioxins and furans). Although most are subject to an immediate ban, a limited health related exemption was given for DDT, which is still needed in many countries to malarial control mosquitoes. This will permit governments to protect their citizens from malaria – a major killer in many tropical regions – until they can find cost-effective and environmentally friendly replacements for DDT.

There is also an exemption in some cases for PCBs, which have been widely used in electrical transformers and other equipment. Governments may maintain existing equipment in a way that prevents leaks until 2025, to give them time to replace PCB-containing equipment. Although PCBs are no longer produced, hundreds of thousands of tonnes are still used in such equipment. A number of country-specific and time-limited exemptions have been agreed for other chemicals. The treaty requires governments to reduce releases of furans and dioxins, which are accidental by-products and thus more difficult to control, "with the goal of their continuing minimization and, where feasible, ultimate elimination".

Other national measures required under the treaty relate to reporting, research, development, monitoring, public information and education. At the international level, a POPs Review Committee will consider additional candidates for the POPs list on a regular basis to ensure that the treaty remains dynamic and responsive to new scientific findings.

"Persistent organic pollutants threaten the health and well-being of humans and wildlife in every region of the world," said Buccini. "This new treaty will protect present and future generations from the cancers, birth defects, and other tragedies caused by POPs."

For more information, contact: Michael Williams, UNEP Information Unit for Conventions, Tel: +41 22 917 8242, E-mail: michael.williams@unep.ch, Internet: www.chem.unep.ch/pops/.

UNEP DTIE on the web

UNEP's Financing Cleaner Production project is now on the Internet at www.financingcp.org (see Web Site Highlights on page 68).

Books & Reports

GENERAL

The Global Reporters

This fourth international survey, by UNEP and SustainAbility, of corporate environmental reporting is the first to introduce sustainability reporting, including economic and social performance, in its assessment criteria. Best practices in corporate reporting by companies around the world are reported, with a focus on companies that received a high score in previous surveys and that are part of the Global Reporting Initiative. For the latest survey, however, new assessment tools and benchmarks were introduced to reflect the changing nature and scope of corporate accountability.

The survey focuses on four main areas of each company's reporting practices. First, it assesses how well a company explains its business context and its short-term and long-term commitments. Management quality is then assessed, including how well the information in a report allows the reader to judge management's actions compared to its stated commitments. Operational performance and impacts during the survey period are analyzed. Finally, the survey looks at the quality of the information based on stakeholders' needs, asking whether the information is useful, timely, accessible and trustworthy.

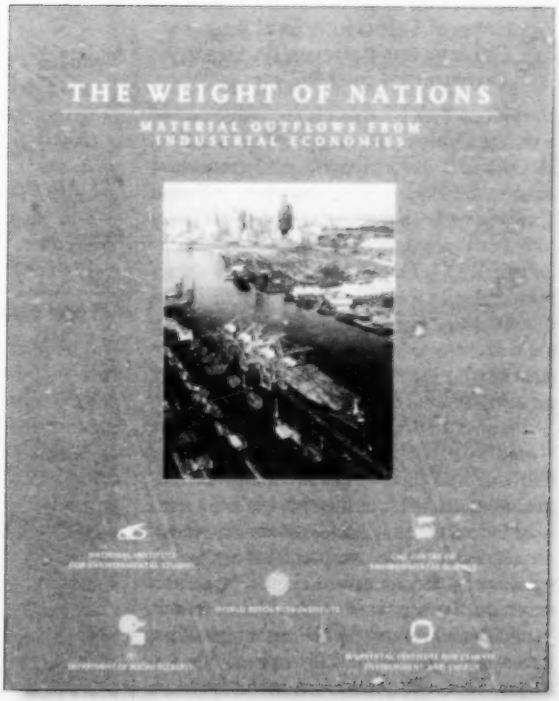
The Global Reporters is part of the joint UNEP/SustainAbility Engaging Stakeholders Programme, which aims to promote corporate environmental reporting, track sectoral and regional reporting trends, and explore links between current environmental reports and sustainable development reporting. The 2000 survey was intended, more specifically, to establish a basis on which to assess the quality of corporate sustainability reporting. It looks at the major trends in different sectors and emerging "hot topics", examining parallels and divergences between corporate sustainability reporting and the broader sustainability agenda.

SustainAbility Ltd., 11-13 Knightsbridge, London SW1X 7LY, UK. Tel: +44 20 7245 1116, Fax: +44 20 7245 1117. Internet: www.sustainability.co.uk. Pbk., 61p. ISBN 1-903168-01-5.

The Weight of Nations: Material Outflows from Industrial Economies

The flow of material resources from the natural environment through the transformative processes of the industrial economy, and back into the environment as waste, has profound impacts on both nature and humans. Standard economic indicators describe an economy's financial flows, but they do not provide enough information about the environmental effects of economic activity. The need to uncouple economic growth from resource use and waste generation is one of the basic tenets of sustainable development.

This report from the World Resources Institute (WRI) argues that material and monetary flows need to be monitored together in order to evaluate the true state of global economies. The authors attempt to measure material flows, focusing on the waste output of Austria, Germany, Japan, the Netherlands and the United States. Researchers from WRI and four other research institutes in Europe and Japan studied waste production and developed models of material and waste flow for each country.



The report shows that the total output of wastes and pollutants in the five countries studied has increased by up to 28% since 1975, despite increasing efficiency in natural resources and energy use. The atmosphere remains the biggest dumping ground for waste, much of it in the form of CO_2 produced by burning fossil fuels. One-half to three-quarters of the material input in these countries is returned to the environment as waste within only a year of its extraction. The authors find no evidence of a trend toward "dematerialization", which they argue is essential for sustainability and should be a policy priority. They call for increased technology transfer from developed to developing countries to allow the latter to bypass older, more polluting technologies in favour of more resource-efficient ones.

E. Matthews et al. (2000). WRI, 10 G Street NE, Washington, DC 20002, USA. Tel: +1 202 729 7600, Fax: +1 202 729 7610. Internet: www.wri.org. Pbk., 125p. ISBN 1-56973-439-9.

Integrated Environmental and Economic Accounting: An Operational Manual

Environmental costs were historically not included in economic accounting, in part because it is difficult to place a value on many environmental resources, but more importantly because in the past the world's resources seemed limitless and the costs of resource use and pollution went unre-

marked. While the difficulty of establishing monetary values remains, there is now widespread recognition that environmental assets and costs are crucial aspects of economic performance as well as human welfare. Agenda 21, adopted at the Rio de Janeiro Earth Summit in 1992, called for integration of environmental costs into accounting methods. In response, the UN Statistics Division developed its System of integrated Environmental and Economic Accounting (SEEA). Although SEEA is a work in progress, parts of the system have been tested in countries in both the developing and developed worlds. This manual provides hands-on guidance for implementation of the more practical SEEA modules: those that can be adopted within reasonable time and cost limits, while remaining consistent with international accounting standards.

The manual provides background information on policy and technical considerations for including the environment in national accounts. A step-by-step approach to SEEA is set out with respect to several resource impact areas (forests, subsoil assets, soil degradation, renewable aquatic resources, and air emissions). Policy, institutional and resource requirements for successful implementation are also discussed. The manual includes examples and demonstrations of techniques for calculating environmental costs and information on using SEEA software.

(2000). UN Publications, Sales Office and Bookshop, CH-1211, Geneva 10, Switzerland. Tel: +41 (22) 917-2614, Fax: +41 (22) 917-0027, E-mail: unpubli@unog.ch, Internet: www.un.org/ Pubs/. Pbk., 235p. ISBN 92-1-161431-7.

ENERGY

Natural Selection: Evolving Choices for Renewable Energy Technology and Policy

Use of fossil fuels is a major factor in increases of both air pollution and atmospheric carbon dioxide emissions. The growing threat from natural disasters and widespread harmful effects of climate change increases the urgent need to move away from fossil fuels towards renewable energy technology (RET). This UNEP publication argues that developing countries can avoid the high consumption and high pollution patterns of energy use that characterize developed countries, while still enjoying the immense benefits that energy provides for human welfare and development.

The first part of the book examines major RETs – wind, solar, biological, hydro, geothermal, fuel cells, and other sources. The advantages and limitations of renewable technologies, and the technical and practical implications of installing them, are discussed. The second part looks at the economic and policy frameworks needed to make a successful transition to renewable sources. It includes markets and capitalization, subsidies, government policies and international agreements. The ingredients of successful RETs are identified, and information is provided on a wide range of international public sector and NGO programmes that support these technologies.

(2000). UNEP DTIE, Tour Mirabeau, 39-43 quai André-Citroën, Paris 75739 Cedex 15, France. Tel: +33 1 44 37 14 50, Fax: +33 1 44 37 14 74, E-mail: unep.tie@unep.fr, Internet: www.unep-tie.org. Pbk., 36p. ISBN 92-807-1968-8.

World Energy Outlook 2000

The International Energy Agency (IEA) publishes an annual review of the global energy situation and forecasts trends in energy demand and supply. In this edition a new way to calculate the "Reference Scenario", which projects energy use figures to the year 2020, has been adopted. Instead of using the earlier business-as-usual approach, the new Reference Scenario takes into account greenhouse gas policies adopted and being put in place by OECD countries.

The *Outlook* projects significant shifts in regions' shares of world energy demand by 2020, with the shares of OECD countries falling and those of developing countries continuing to rise. Fossil fuels are expected to account for about 90% of total primary energy, a slight overall increase compared with their current share. The report includes extensive data tables and figures on various energy sources and on global and regional production, use and trade patterns.

Despite attempts to reduce global CO_2 emissions, these emissions are projected to rise by 60% between 2000 and 2020. Emissions in the developed countries are expected to be significantly higher than allowed by their Kyoto Protocol commitments. The report also presents three alternative cases based on different assumptions about climate change policies. The first examines the impacts of CO_2 emissions trading; the second looks at the effect of applying climate change control policies to the transport sector; and the last demonstrates the possibilities for slowing the rise in CO_2 emissions by switching to alternative fuels and improved technologies.

(2000). IEA, 9, rue de la Fédération, 75739 Paris Cedex, France. Tel: +33 (1) 40 57 66 70, Fax: +33 (1) 40 57 66 59, Internet: www.iea.org. Pbk., 457p. ISBN 92-64-18513-5.

Web Site Highlights

Climate Change Knowledge Network

www.cckn.net

The Climate Change Knowledge Network is a coalition of over a dozen organizations from developing, transitional and developed countries. The network aims to contribute to a more effective, sustainable and equitable climate change regime through undertaking collaborative research and action on issues such as the Kyoto mechanisms, adaptation to climate change, and technology transfer; building capacity in developing and developed countries in order to better understand and address climate change issues; and communicating information and knowledge within and outside the network.

For more information, contact: Victoria Kellett, Project Manager, International Institute for Sustainable Development, Tel: +1 613 238 2296, Fax: +1 613 238 8515, E-mail: vkellett@iisd.ca.

Financing Cleaner Production

www.financingcp.org

UNEP is undertaking a four-year project to increase investments in cleaner production in developing countries. This project will demonstrate how such investments can be stimulated through helping financial institutions understand the importance of cleaner production, and helping cleaner production experts develop creditworthy investment proposals. The web site gives information on project news, success stories, links, investments, training and tools.

For more information, contact: Elena Ciccozzi, UNEP DTIE Paris, Tel: +33 1 44 37 14 50, E-mail: unep.tie@unep.fr.

ELDIS Development Reporter

www. ids.ac.uk/eldis

ELDIS is an Internet gateway to a broad range of information sources on development and the environment. The site is organized according to major development topics – environment, agriculture, social and economic issues, disasters, education, and others. There is a searchable database of 10,000 key documents and organizations, and 100,000 selected web pages, as well as environmental data sets, statistics and maps.

For more information, contact: Tracy Zussman-Kay, Eldis Project, Institute of Development Studies, University of Sussex, Falmer, Brighton BN1 9RE, UK. Tel: +44 1273 877330, Fax: +44 1273 621202, E-mail: eldis@ids.ac.uk.

Environmental Practices in Offshore Oil & Gas Activities

This report documents a June 2000 expert meeting on the environmental aspects of offshore oil and gas production. The International Expert Meeting on Environmental Practices in Offshore Oil & Gas Activities was held in Stavanger, Norway. The participants from over 40 countries included representatives of oil companies, governments, UNEP, the World Bank, and environmental and wildlife groups. The meeting focused on four main areas: environmental management systems, environmental reporting, environmental impact assessment (with a special emphasis on social impacts), and information systems and tools. The report includes a summary of keynote speeches and plenary presentations on the main topics, the results of the working sessions, and a background paper presenting major issues. It is available on the UNEP DTIE Offshore Oil and Gas Environment Forum web site, at *www.natural-resources.org/offshore*.

CLIMATE CHANGE/ AIR POLLUTION

"On Behalf of My Delegation...": A Survival Guide for Developing Country Climate Change Negotiators

Developing country representatives who participate in ongoing climate change negotiations are often primarily meteorologists, environmentalists, policy-makers and scientists thrust into the job of negotiator with little preparation. The high complexity of the negotiations is matched by their intense pressure and pace. It is therefore essential for participants to "get up to speed" quickly. *"On Behalf of My Delegation..."* has two aims: to provide immediate aid and guidance to negotiators from the South entering the climate change talks, and to sum up and suggest ways to address the problems often faced by developing country negotiators.

The first section summarizes the negotiating context, describing the science, impacts and policy implications of climate change. Subsequent chapters present the UN Framework Convention on Climate Change and Kyoto Protocol, describe the roles of various international bodies, and lay out the rules, procedures and alliances, both formal and informal, that govern negotiations and their outcomes. The second half of the book is devoted to negotiating skills and strategies, with a section giving advice to single-member delegations.

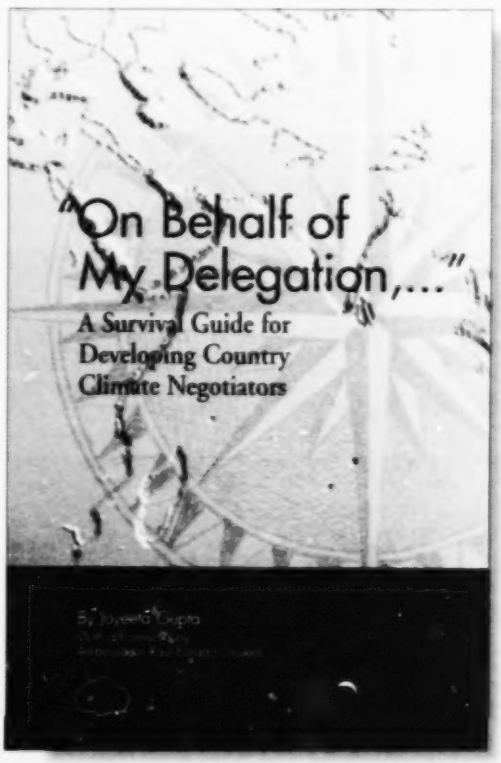
J. Gupta (2000). Center for Sustainable Development of the Americas, 1700 Connecticut Avenue NW, Suite 403, Washington, DC 20009, USA. Tel: +1 202 588 0155, Fax: +1 202 588 0756, E-mail: info@csdanet.org, Internet: www.csdanet.org. Pbk., 98p. ISBN 1-895536-29-4.

Climate Change Vulnerability: Linking Impacts and Adaptation

This study by UNEP and the Environmental Change Institute looks at what makes human populations and regions vulnerable to climate change related events. It is likely that atmospheric conditions that can lead to climate change will persist well into the 21st century, even if efforts are made to control greenhouse gas emissions. Adapting to the possible effects of climate change is therefore a necessity.

Vulnerability to climate change effects is defined in this study as a function of three factors: sensitivity to climatic variability, the risk of adverse climate change, and capacity to adapt to events or changed conditions. Because many of the possible impacts of climate change are uncertain, vulnerability is constantly changing. The authors argue that strategies for adapting to climate change should include responsive institutions and a wide range of policy options. To that end, they assess the types of information needed concerning vulnerability and adaptation, identify the issues and challenges involved, and recommend capacity building measures for vulnerability assessment.

(2000). UNEP Division of Policy Development and Law, PO Box 30552, Nairobi, Kenya. Tel: +254 2 62 4215, Fax: +254 2 62 2788, Internet: www.unep.org, Pbk., 35p.



INDUSTRY SECTORS

Delivery of Biocontrol Technologies to IPM Farmers

Integrated Pest Management (IPM) calls for the coordinated use of pesticides, natural pest control, crop selection and farming techniques to reduce crop damage from pests while minimizing environmental impacts. As IPM becomes more widespread, it relies increasingly on farmers to find local solutions and to test and incorporate new technologies. There is considerable demand for biocontrol technologies (biopesticides and macrobiological control agents). However, the development of such technologies has been slow, in part because the pesticide industry has not found it economically practical. Smaller companies, often operating more locally, have received little government support and often suffer from inadequate product development, quality and safety and from unfavourable regulatory climates. UNEP and CAB International have begun a series of case studies to consider critical issues related to the delivery of biocontrol technologies to farmers using IPM. Three titles have been published:

Delivery of Biocontrol Technologies to IPM Farmers: India looks at the use of an entomophagous parasite, Trichogramma, to control lepidopterous pests on field crops. *D. Raj and G. Hill. Pbk., 19p.*

Delivery of Biocontrol Technologies to IPM Farmers: Nicaragua studies biopesticides based on entomopathogenic fungi to control pests in field and pasture crops. *S. Williamson and B. Ali. Pbk., 39p. ISBN 92-807-1917-3.*

Delivery of Biocontrol Technologies to IPM Farmers: Vietnam examines the use of fungal antagonists in the genus *Trichoderma* to control plant diseases. *N.E. Jenkins and J.G.M. Vos (2000). Pbk., 32p. ISBN 92-807-1848-7.*

Information on other titles related to biological pest control is also available on CABI's web site (see below).

(2000). CABI Bioscience, Silwood Park, Buckhurst Road, Ascot, Berkshire SL5 7TA, UK. Tel: +44 1344 872999, Fax: +44 1491 829123, E-mail: bioscience@cabi.org, Internet: www.cabi.org.

NATIONAL/REGIONAL

Implementation of the OECD Recommendations on the Environmental Performance of France: Mid-term Assessment

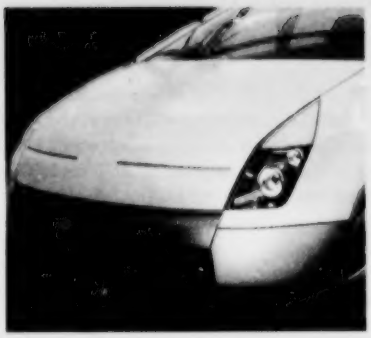
The Organisation for Economic Co-ordination and Development (OECD) reviewed France's environmental situation and performance in 1996, as part of the environmental review programme covering all its member countries. Three years later, the French Ministry for Regional Planning and the Environment began assessing the implementation of the 58 recommendations in

the original report. The purpose of this review was to evaluate France's progress in the area of environmental policy, and to prepare for the second cycle of OECD reviews beginning at the end of 2000. The results show that greater progress has been made in sectoral policies than in integration of the environment into other policy areas.

The report includes background information on each major review subject, and a point-by-point list of the OECD recommendations and the actions taken. A scoring system, ranging from 0 to 3, was used to show progress in implementing each recommendation. The average of all scores was 1.38, indicating that some advances have been made, notably in areas the OECD had described as weak points, but that major efforts are still necessary regarding institutional integration, transport, coastal areas and international cooperation.

(2000). Ministère de l'Aménagement du Territoire et de l'Environnement, 20, avenue de Ségur, 75302 Paris 7 SP, France. Tel: +33 1 42 19 20 21, Fax: +33 1 42 19 11 23, Internet: www.environnement.gouv.fr. Pbk., 44p.

From Brazil



As Technical Director of the Brazilian Foundation for the Conservation of Nature, I have just received your *Industry and Environment* Volume 23, No. 1-2, January-June 2000. As I was very much involved with the Manatee Project in the Northeast Region of Brazil (I was actually responsible for setting up its Base in the State of Alagoas), allow me to point out a printing error on page 93: above the photograph of a manatee calf being fed it should read *Trichechus inunguis* (the freshwater species) and not *Trichechus munguis*...

Thanks for mentioning these fantastic animals in your publication. I hold them very dear and they need all the help they can get from the international community.

Hoping you will keep running UNEP DTIE with the same care and competence you have been for the last years, I wish you all the success and prosperity for this Third Millennium.

Mario Antonio de Mello Dias
(fbcnbr@uol.com.br)

THE UNEP DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS

Current uses and development of natural resources, technologies and production processes, as well as urbanization patterns, have negative effects on human health and the environment. This is illustrated by unsustainable use of water, land and energy, air and water pollution, persistent and toxic bio-accumulative chemicals in the food chain, and other industry-related problems.

To have a healthy environment, we need to change how we produce and consume goods and services. This change involves revising and developing economic policies and trade practices, so as to integrate environmental issues in the planning and assessment processes.

UNEP's Division of Technology, Industry and Economics (UNEP DTIE) was created in 1998 to help decision-makers in governments, local authorities and industry develop and adopt policies and practices that:

- are cleaner and safer;
- use natural resources efficiently;
- ensure adequate management of chemicals;
- incorporate environmental costs;
- reduce pollution and risks for humans and the environment.

UNEP DTIE, whose main office is in Paris, is composed of:

◆ **The International Environmental Technology Centre (Osaka)**, which promotes the adoption and use of environmentally sound technologies, with a focus on the environmental management of cities and freshwater basins, in developing countries and countries in transition.

◆ **The Production and Consumption Unit (Paris)**, which fosters the development of cleaner and safer production and consumption patterns that lead to increased efficiency in the use of natural resources and reductions in pollution.

◆ **The Chemicals Unit (Geneva)**, which promotes sustainable development by catalyzing global actions and building national capacities for the sound management of chemicals and the improvement of chemical safety world-wide, with a priority on Persistent Organic Pollutants (POPs) and Prior Informed Consent (PIC, jointly with FAO).

◆ **The Energy and OzonAction Unit (Paris)**, which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition, and promotes good management practices and use of energy, with a focus on atmospheric impacts. The UNEP/RISØ Collaborating Centre on Energy and Environment supports the work of this Unit.

◆ **The Economics and Trade Unit (Geneva)**, which promotes the use and application of assessment and incentive tools for environmental policy, and helps improve the understanding of linkages between trade and environment and the role of financial institutions in promoting sustainable development.

UNEP

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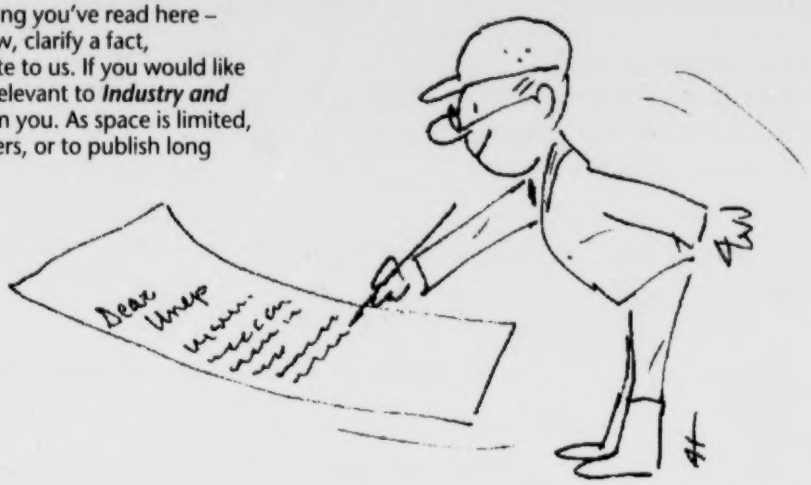

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For over 20 years, the quarterly *Industry and Environment* has provided a forum for exchanging information and experience. Articles are contributed by industry managers, government officials, researchers and others active in the field of sustainable industrial development. Besides reporting on developments of broad international interest, each issue focuses on a particular theme. The themes of recent issues have included the agri-food industry, consumption patterns, urban environmental management, sustainable energy, and mining and sustainable development. For a list of past issues and their availability, contact UNEP DTIE or visit http://www.uneptie.org/hp_division_office.html.

The next issue of *Industry and Environment* will focus on transport.

Industry and Environment is an English language publication, but it often includes articles in French and Spanish. All contributed articles are accompanied by summaries in English, French and Spanish.

The review is also published in Chinese.
For further details, please contact:
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